



**SAN JUAN RIVER BASIN RECOVERY  
IMPLEMENTATION PROGRAM  
BIOLOGY COMMITTEE  
22-23 February 2022 MEETING  
SUMMARY**

| <b>Biology Committee (BC) Members:</b> | <b>Representing</b>                             |
|--|---|
| Harry Crockett (Chair)                 | State of Colorado                               |
| Matthew Zeigler                        | State of New Mexico                             |
| Jacob Mazzone                          | Jicarilla Apache Nation                         |
| William Miller                         | Southern Ute Indian Tribe                       |
| Vince Lamarra                          | Navajo Nation                                   |
| Absent                                 | Ute Mountain Ute Tribe                          |
| Brian Westfall                         | U.S. Bureau of Indian Affairs                   |
| Stephen Davenport                      | U.S. Fish and Wildlife Service, Legacy Region 2 |
| Mark McKinstry                         | U.S. Bureau of Reclamation                      |
| Benjamin Schleicher                    | U.S. Fish and Wildlife Service, Legacy Region 6 |
| Ryan Besser                            | U.S. Bureau of Land Management                  |
| AJ Keith                               | The Nature Conservancy                          |
| Tom Chart                              | Water Development Interests                     |

| <b>Program Office (PO):</b>                  | <b>Representing</b>            |
|--|--------------------------------|
| Melissa Mata, Program Coordinator            | U.S. Fish and Wildlife Service |
| Eliza Gilbert, Assistant Program Coordinator | U.S. Fish and Wildlife Service |
| Scott Durst, Science Coordinator             | U.S. Fish and Wildlife Service |
| Raphaella Ware, Program Biologist            | U.S. Fish and Wildlife Service |
| Kayla Kelley, Program Fellow                 | U.S. Fish and Wildlife Service |

| <b>Other Interested Parties:</b> | <b>Representing:</b>                   |
|----------------------------------|--|
| Adam Barkalow, BC Alternate      | New Mexico Department of Game and Fish |
| Wade Wilson                      | U.S. Fish and Wildlife Service         |
| Nathan Franssen                  | U.S. Fish and Wildlife Service         |
| Tildon Jones                     | U.S. Fish and Wildlife Service         |
| Susan Behery                     | U.S. Bureau of Reclamation             |
| Steve Mussmann                   | U.S. Fish and Wildlife Service         |
| Dan Lamarra, BC alternate        | Ecosystems Research Institute          |
| Diego Araujo                     | U.S. Fish and Wildlife Service         |
| Brian Hines                      | Utah Department of Wildlife Resources  |
| Casey Pennock                    | Utah State University                  |
| Colleen Cunningham, CC Alternate | State of New Mexico                    |
| Weston Furr                      | U.S. Fish and Wildlife Service         |
| Tracy Diver, BC alternate        | U.S. Fish and Wildlife Service         |
| John Cleveland                   | Kansas State University                |

| <b>Other Interested Parties:</b> | <b>Representing:</b>                          |
|----------------------------------|---|
| Katie Creighton                  | Utah Department of Wildlife Resources         |
| Matthew Bogaard                  | Kansas State University                       |
| Steve Platania                   | American Southwest Ichthyological Researchers |
| Mike Farrington                  | American Southwest Ichthyological Researchers |
| Melody Saltzgeber                | U.S. Fish and Wildlife Service                |
| Sophia Bonjour                   | Kansas State University                       |
| Keith Gido                       | Kansas State University                       |
| Stephani Clark Barkalow          | American Southwest Ichthyological Researchers |
| Manuel Ulibarri                  | U.S. Fish and Wildlife Service                |
| Melissa Trammel                  | U.S. National Park Service                    |
| Kim Yazzie                       | Navajo Nation Fish and Wildlife               |
| Jerrod Bowman                    | Navajo Nation Fish and Wildlife               |
| Mel Warren                       | Peer Reviewer                                 |
| Ben Zimmerman, BC alternate      | Southern Ute Indian Tribe                     |
| James Whitney                    | Pittsburg State University                    |
| Blake Hansen                     | Pittsburg State University                    |
| Shawn Sartorius                  | U.S. Fish and Wildlife Service                |
| Jeff Arnold                      | U.S. National Park Service                    |
| Emily DeArmon                    | Museum of Southwestern Biology                |
| Nate Casewell                    | U.S. Fish and Wildlife Service                |
| Carrie Padgett, BC alternate     | Water Development Interests                   |
| Eric Creeden                     | Bureau of Reclamation                         |
| Ryan Christensen, CC alternate   | U.S. Bureau of Reclamation                    |
| Dale Ryden, CC alternate         | U.S. Fish and Wildlife Service                |
| Keith Lawrence                   | Unknown Representation                        |
| Ben Miller                       | Utah State University                         |

### **Introductions and changes to agenda**

No changes to the agenda were requested.

### **Approve draft summary from 30 November - 2 December 2021 BC meeting; review Action Item list**

All comments were minor and accepted from Barkalow, Zeigler, Miller, and Chart. The video links from the non-native symposium did not work and Miller asked for a summary of key points if links cannot be fixed. Chart motioned to postpone summary approval until a review of the final draft and nonnative symposium links were fixed or a summary was incorporated. Crockett seconded. Gilbert mentioned Program website is 1-2 weeks away from launch and there is a delay due to organizing and uploading documents.

### **Action items from previous meeting:**

1. *Mata will continue to work on a path forward for the Nonnative Fish Stocking Cooperative Agreement and report back to the BC and CC. This topic is on the meeting agenda.*
2. *The previous meeting summaries will be finalized and uploaded to the website. Completed.*
3. *The BC roster will be updated and uploaded to the website. Completed.*
4. *The process for email voting will be edited and presented to the CC for their consideration. Moved to CC.*
5. *Keith will confer with TNC about his possible role as BC chair. Resolved.*
6. *The BC recommendation regarding the DROA releases will be passed to the CC for their review. DROA release recommendation shared with CC; first round of DROA releases were subsequently cancelled.*
7. *The PO will pass along the BC's recommendation for tasks to be completed at the Phase III site to Navajo Nation. On today's agenda.*
8. *The PO will provide an email to seek participation for a Nonnative fish management group. Completed.*
9. *Mata will create a post-2023 efficiency team after the New Year. Still outstanding.*
10. *The PO will send out a doodle poll to BC members for the February BC meeting. Resolved.*

### **Discuss creation of BC vice chair position and how best to share chair responsibilities - Mazzone**

Mazzone sent an email addressing sharing BC Chair responsibilities on a rotating schedule and his recommendation against creating a vice-chair position (as done in the Upper Basin Program).

Mazzone suggests increasing a more frequent rotation to reinvigorate participation. Miller agrees and suggests mimicking Upper Colorado Endangered Fish Recovery Program (Upper Basin) – 1 year commitment, rotating through agencies. Crockett mentioned that in the Upper Basin Biology Committee members often have to skip a turn because of other work responsibilities, but the incumbent often keeps things moving until a replacement is elected. Durst and Miller point out Crockett is the BC Chair for the next 2 years and suggests the BC address how to move forward at a later time.

## **2021 Project Reports/Presentations**

### **2021 operations hydrology and forecast of possible 2022 hydrology operations - Behery**

Although there was average snowpack, it melted earlier than usual and that, in addition to dry soil conditions going into the winter, resulted in low inflow to Navajo Reservoir and no spring release in 2021. Although the Bureau of Reclamation (Reclamation) was able to maintain baseflows required at Four Corners, no other flow targets were met in 2021. Behery reminded everyone that the last time all flow targets were achieved, except the 8,000 cfs, was in 2019. Although current soil conditions have improved from last year's record dry levels in San Juan River Basin, they remain below normal in some basin locations due to the lack of runoff from last year. The 2021 water storage was about the same as 2020 water storage. Navajo Reservoir is not forecasting a shortage. The current snowpack is 84% of the average but there is a chance levels may dip down to a shortage declaration. Behery mentioned that there is a chance to have a spring peak release next year (2023) depending on snowpack.

So far for 2022, the San Juan River is maintaining minimum flow targets with releases of 300-400 cfs from Navajo Reservoir. Based on available water calculation, no spring peak release is currently planned. No flow targets are projected to be achieved. Snowpack and streamflow are similar to 2021, when the river peaked at 2,500 cfs for 3-days. Flows at Four Corners will depend on timing of Animas River runoff. Because of monsoon activity, 2022 is a perturbation year. The last 4 consecutive years were not perturbation years. Franssen inquired about DROA releases. Behery stated that there are not any DROA releases planned, but Reclamation may revisit conditions for release after March. Chart asked if there was provision in the Record of Decision for experimental short-term releases to assist with actions like non-native fish control or habitat management. Behery responded that the Record of Decision for Navajo Reservoir operations does not address any specific flow regime and is oriented to meet flow targets for listed species. She also said if the Recovery Program wanted to do experimental flows, Reclamation would be open to that.

### **San Juan River Habitat monitoring 2021 overview - Lamarra**

D. Lamarra concluded that low velocity habitat was dramatically reduced this year, likely due to the increased flows at mapping. He said the increased flows reduced the amount of secondary channel low velocity habitat area. Due to storm related increased flows in the lower river at the time of mapping, large lateral washes in the lower canyon were connected to the main channel and available as habitat. He reported that most tributaries were flowing, and that a large wash flowing into the river at river mile 68 created a sizable ephemeral "wetland". McKinstry and Farrington noted that ephemeral nursery habitat is Chinle, a large lateral wash, and would be short-lived. V. Lamarra commented that the majority of habitat seemed to be influenced by lower flows, whereas the canyon was influenced by higher flows.

### **Backwater productivity assessment – Whitney**

The purpose of the project is to assess whether stability, physicochemical characteristics, resource availability, and nonnative densities differ between secondary channel and island backwaters. Overall, no significant differences have been detected between backwater nursery characteristics. Nonnative fish were abundant in both secondary channel and island backwaters (Red Shiners, Fathead Minnows,

and Western Mosquitofish). The nonnatives species rebounded after the monsoonal flood pulses, but this was not apparent for the native species. Warren noted that preliminary fish density data show substantially overlapping confidence intervals, indicating means are not significantly different and suggested an analysis of covariance to better identify any differences. Franssen remarked that the temperature for secondary channels were a degree cooler than islands and committee members hypothesized it was due to hyporheic flows as observed in Phase I and II sites. Barkalow suggested that the results may be better analyzed at the site-level to pinpoint characteristics that provide ideal zero velocity habitat, and this may help alleviate some of the wide variation present in the dataset.

### **Colorado Pikeminnow broodstock collection - Platania**

Platania reported that although 2020 was a fantastic year for Colorado Pikeminnow broodstock sampling, 2021 was not. The initial goal was to capture and transport wild Colorado Pikeminnow to Southwestern Native Aquatic Resources and Recovery Center (SNARRC), to increase genetic diversity of the existing Colorado Pikeminnow broodstock. However, in August and September conditions were poor with silt and debris loading due to monsoonal floods, which made seining ineffective. Ultimately, collection days were cancelled due to poor river habitat conditions. Platania mentioned that the sampling plan will continue in 2022 and Jones remarked funding will rollover from 2021 and assured there is funding for collections from the middle Green river for 2022. Jones speculated that SNARRC may have space to hold broodstock but might not have space for species production. Jones also mentioned the need for genetic analysis and a management plan to strategically manage between both basins. Concerns were voiced about how much genetic information needs to be collected and whether wild cohorts need to be kept separate, which would be much harder for hatchery facilities. Ulibarri mentioned that Colorado Pikeminnow collected near Vernal and held at Ouray are now at Dexter. He said other hatcheries are working on techniques and husbandry practices and determining their capacity for production. McKinstry is concerned we are relying too much on SNARRC and mentioned that the infrastructure bill might be an opportunity to increase capacity at other hatcheries.

### **Rare fish stocking summary and stocking Razorback Sucker in Lake Powell - Schleicher**

Schleicher presented a summary of 2021 rare fish stocking that occurred in the San Juan River inflow area of Lake Powell. The goals of this project are to see if Razorback sucker can survive in this habitat. In March 2021 3,000 Razorback Suckers were stocked. The fish ranged between 78-315mm in size and were all PIT tagged. After fish were transferred to the inflow area, an analysis of fish detections has not been done to date. Schleicher explained that he anticipates detecting stocked fish from 2021 during sampling Lake Powell during 2023. McKinstry remarked that Pennock et al. 2021 found that a significant number (40-60%) of fish in Lake Powell came upstream and hit the antennae at the waterfall. McKinstry mentioned this work of stocking smaller fish below the waterfall to see whether fish can recruit in the lake itself should be a cost-effective method of data collection since the antenna at the waterfall is fairly efficient at detecting fish. Ryden commented that fish were not stocked in the Animas because flows were so low, and they did not want fish to get stranded.

### **NAPI Ponds management - Bowman**

Bowman was unable to give presentation but passed along the following information for the meeting. Approximately 6,000 Razorback Sucker were stocked into NAPI ponds from SNARRC in May 2021. All ponds have updated kettles and new draining systems. The total number of Razorback Sucker stocked during active harvest was 3,462 with a total mortality of 481. Including passive harvest a total of 3,723 Razorback Sucker >300mm TL (62% return rate on stocking from SNARRC) were stocked at PNM, Montezuma Creek, Verde del Rio Park, Penny Lane and Berg Park in 2021.

### **Operation of PNM Fish Passage - Yazzie**

PNM fish passage opened in June and was open for 147 days, in August sediment build up shut down the operation. The Program Office (PO), Navajo Nation and Jicarilla installed a wood/PVC gate to assess if the previous metal screen deterred fish from entering the capture basin. The passage will be operated open from March-May in 2022 and plans are underway to increase the size between grates in the upstream trash rack to allow larger fish to pass. Warren inquired whether capital funds could help with the passage improvements. Gilbert remarked that there is nothing prohibiting the use of capital funds for this project but encourages strategizing how to most efficiently implement improvements. Ryden added that the issue of sediment choking would not likely be resolved with capital funds because it is associated with natural flows of the river.

McKinstry commented that PIT antenna data shows fish are successfully finding the passage opening. There has been success at getting fish through the facility when it is operated from March to May. Kelley is doing an in-depth analysis of passage at PNM utilizing antenna data; however, some challenges are 1) the number of antennas has increased over time, 2) there are periods when some or all antennas are not working, and 3) operations have changed periodically.

### **Nonnative fish management – NMFWCO - Furr**

Nonnative removal exploitation rates during winter in 2021 and 2022 were 17.8% and 14.9%, respectively, which is lower than what has been estimated to “crash” the Channel Catfish population. Also, Channel Catfish abundance estimates for the sampled reach varied for 2021 and 2022, 20,001 and 68,150 fish, respectively. Davenport added that flows and warmer temperatures could be influencing population variability. A. Barkalow mentioned large peaks and valleys in small-bodied Channel Catfish densities throughout 2003-2021; and this fluctuation is a commonly observed phenomenon. Crockett commented that differences in sampling efficiency should have an effect on confidence intervals but not on the population estimates. McKinstry points out that a challenge may be that such a small proportion of the population is tagged, so the difference in catching 5-10 more fish during each sampling period can disproportionately change the estimate. McKinstry also questioned the efficacy of nonnative removal if the removal rate is less than 60%. Furr and Davenport intend to do a deeper analysis of the data.

### **Larval fish monitoring – Farrington**

Farrington described 3 study areas for the larval fish monitoring in 2021.

1. Long-Term – Shiprock to Clay Hills (mid April – late July)

2. Expanded – Farmington to just upstream of APS weir (Sampled twice post Colorado Pikeminnow spawning) to see if spawning is above APS weir
3. Below the Waterfall – San Juan arm of Lake Powell (late May – August)

Farrington mentioned that they have not completed examining all of the samples due to the large number of larvae that they collected this year. Samples from 2021 are will being processed, but 2021 is a record for larval numbers. In the Long-Term study area 847 age-0 Razorback Sucker, 89 age-0 Catostomidae (Farrington is developing a profile so that genetic information can be tied back to photographs of these species), 145 age-0 Colorado Pikeminnow, and 31 age-1 Colorado Pikeminnow have been identified to-date. The ASIR staff have identified over 90,000 fish in 2021, but roughly 70,000 were Red Shiners, which is a large increase compared to recent years. The Razorback Sucker mixture-model estimates look relatively consistent with the last few years (better than 2020 and 2019, less than 2018). Colorado Pikeminnow mixture-model estimate for 2021 is similar to 2020, which was a good year. Red Shiner mixture-model continues increasing population size from 1,700 (2019), 20,092 (2020), to ~70,000 (2021). The Red Shiner mixture model estimate numbers are similar to data points from early 2000s. In conclusion Farrington reiterates that Razorback Sucker have been documented spawning for 23 consecutive years, while Colorado Pikeminnow have been spawning consecutively for the last 9 years. Both age-0 and age-1 Red Shiner numbers are among the highest recorded during the tenure of this study. Warren asked if there was any speculation towards why red shiner population is booming, Farrington replied that they are not sure. Chart asked if Farrington knew what lead to red shiner population dropping in 2015, Farrington does not know (possibly temperature) but would like to know if there is a way to integrate that phenomenon and investigate further for future determinations. McKinstry asked if Farrington expected it be to a good year for Colorado Pikeminnow considering the hydrograph showed a low flow year. Farrington remarked that 2021 is most similar to 2020 data, and that was a good year; however, although high flow years are good for Colorado Pikeminnow, the data does not suggest mediocre flow years are bad for Colorado Pikeminnow population. Bill Miller also shared that some data from the Upper Basin, after big peak years (as many as 2-3 years later), can have a good population boost for Colorado Pikeminnow because of the prep years beforehand. Farrington also speculated that we could be seeing that situation here depending on perturbation (monsoons that dump sediment into the system). Big flow years are critical for resetting environment and setting up success for future years.

### **Small-bodied fish monitoring – A. Barkalow**

This project sampled the primary channel, secondary channels, and large zero velocity channels to document the survival of early life stages and their recruitment into subsequent life stages. A. Barkalow reported age-0 Colorado Pikeminnow were not detected during 2021, although 26 age-1 Colorado Pikeminnow were captured. Age-1 Colorado Pikeminnow were primarily detected downstream of Montezuma Creek, this could be due to stocking that occurred in McElmo Creek. Age-1 Colorado Pikeminnow were captured in all three channel types, although the majority could be found in the primary and zero velocity channel types. Age-1 Colorado Pikeminnow caught were initially untagged, but whether they are wild or stocked is unknown. Overall, this is an increase in the density of native fish from recent surveys. The surveys also reflected an increase in Red Shiner densities. Neither Razorback Sucker nor Roundtail Chub were not detected during 2021 sampling.

### **Wild age-1 Razorback Sucker monitoring – Schleicher**

The original goal of this project was to compare survival of age-0 fish to age-1 following a high water and low water year (2019 versus 2020), however due to not sampling in 2020 because of COVID, there was no high water data for comparison as sampling was postponed until 2021. Speculatively, Schleicher is confident that annual age-1 recruitment is low given low catch rates. Twenty-four field-identified Razorback Sucker were captured in 2021 (still waiting on genetic results). Razorback Sucker under 300mm TL became more abundant around Aneth downstream to Slickhorn. Colorado Pikeminnow of all sizes were captured and seen throughout the river, with a noticeable spike associated with the McElmo area (possibly due to recent stocking). There was a drastic decrease in Colorado Pikeminnow captured in 2021 compared to 2019 and there was no detection of potential wild fish from 2019 Colorado Pikeminnow cohort. Ultimately, comparing “extreme low” and “normal low” water years, “extreme low” appears to be better for rearing age-0 Razorback Sucker although the fish analyzed in 2019 were genetically identified as hybrids. Larval data shows that Razorback Sucker can spawn all the way up to the confluence of the Animas and San Juan River. The data also reflects that there may not be rearing habitat, or it may not be available until the Four Corners area and continue down river, however, this may be a function of larval drift. Genetic results from 2021 are still pending, but sub samples taken in 2019 and all samples taken in 2020 have come back as hybrids. This begs the question why hybrids survive and pure Razorback Sucker larvae are not. Were the past 2 years an anomaly or is this something that will persist into the future? While this would normally happen at some level since both are native, the survival of hybrids over pure Razorback Sucker is concerning and deserves a closer look.

### **Demographic monitoring – Schleicher/Hines/NMFWCO**

Hines explained that they used electrofishing boats to only capture endangered species and closed capture models in Program MARK to estimate age-specific abundance for Razorback Sucker and Colorado Pikeminnow. All ages of Colorado Pikeminnow had low capture probability and wide confidence intervals for abundance estimates. However, Razorback Sucker had higher capture probability and narrower confidence intervals around abundance estimates. McKinstry pointed out that environmental conditions and sampling was the same for both species, so the capture probability difference highlights a difference in the species themselves. Hines mentioned that Colorado Pikeminnow could develop an avoidance to electrofishing, and that after the third year is done, he may incorporate antenna detection data. However, the behavioral model supported capture and recapture rates for Colorado Pikeminnow are low.

### **Nonnative vegetation to enhance in-stream habitat for native fishes – Ben Miller**

There has been increasing habitat loss and degradation in the San Juan River, including modified flow regime, the establishment of nonnative vegetation, and in-stream habitat simplification. Ben Miller presented on utilizing nonnative wood species as the “treatment” to increase food resources, create low velocity habitats, and increase geomorphic complexity. Variables used to compare the Treatment vs Reference sites are fish PIT tag detections, fish density, fish species richness, and flow and/or depth of water. Although the Treatment locations caught more fish, the capture numbers and densities between native and nonnative were very similar. Species richness was slightly higher in Treatment sites. There was no significant difference for water flow or depth between Treatment and Reference sites. Beaver

activity was present at all Treatment sites, and some sites were destroyed. Potential solutions for 2022 would be fewer, larger structures – instead of branches, planting entire trees, and selecting different location sites. Crockett comments that nonnatives seem to have equal or better support than natives in the treatment area when comparing fish densities. Ben Miller comments that although it does not seem like there is a significant difference between nonnative and native densities, there were higher proportional increase in native densities in Treatment sites than Reference sites.

***Quantifying effective number of breeders and genetic diversity – Mussmann/Saltzgeber***

The purpose of this project is to compare genetic analysis methods, quantify the effective breeding population for Colorado Pikeminnow and Razorback Sucker, examine facilitated fish passage of Razorback Sucker, and the spatial distribution of larvae and full siblings for Colorado Pikeminnow and Razorback Sucker. When comparing genotyping methods, both microsatellites and SNPs came back with a similar result, which encourages the transition to solely SNP genotyping in the future. The genetic analysis detected Flannelmouth-Razorback Sucker hybrids, although there seems to be no strong selection for or against hybrids. Hybridization is easier to detect in adults than larvae and most hybrids were detected having a Razorback Sucker mother, which genetically maintains ancestral information. None of the adult fish collected in 2020 appeared to contribute to the larvae, but collections were truncated due to COVID restrictions. Overall, Colorado Pikeminnow have a highly variable number of individuals contributing to breeding. Razorback Sucker have a consistently low breeding population that equally contributes to spawning individuals. Some siblings were found in the same area, but larvae also drift down river. The data did show adult stocked Razorback Sucker over the waterfall, and although none appeared to contribute to the 2020 larvae, several collected were full siblings. A similar effort will be conducted for the 2021 samples in fiscal year 2022.

***Facilitated passage in the San Juan River – Bogaard***

There are two movement barriers to fish in the San Juan River: 1) Piute Farms Waterfall (PFW) and 2) Public Service Company of New Mexico (PNM) weir. The purpose of this project is to determine how long translocated fish remain upstream of each barrier, and if translocated Razorback Sucker congregate in upstream habitats during the spawning season. A single PIT tag antenna detected 36% (28 individuals) of Colorado Pikeminnow and 39% (216 individuals) of Razorback Sucker moved above the waterfall. At PFW more than 80% of Razorback Sucker translocated upstream remained upstream (23 days) during the spawning season before returning downstream. At PNM more than 60% of Razorback Sucker remained upstream (26 days) during the spawning season before returning downstream. There is no evidence of translocated fish successfully spawning, but it is possible if larvae were produced that they drifted downstream of barriers but were not collected during larval monitoring. Translocated fish were documented aggregating at upstream spawning sites. These project results suggest that improving access to spawning habitats could increase reproductive output.

***Lower Colorado River and Grand Canyon larval Razorback Sucker genetics – Tom Dowling***

The objective of this project is to use genetic markers to quantify patterns of genetic variation over time, estimate effective population size, and quantify the levels of hybridization. The data showed that Lake Mojave has the highest amount of diversity for Razorback Sucker and that diversity decreases as you move upstream. Populations from Lake Mojave and Lake Mead from the late 1980s were not

different from each other, while some differentiation was observed above and below the Grand Canyon. The population in Lake Mead has changed and is now distinctly different than the population in Lake Mojave. In Lake Mead, the impact from hybridization is mostly restricted to Colorado River Inflow. Dowling mentioned that hybrids predominate in larvae at the Colorado River Inflow. Genetic assessment from Grand Canyon showed that all Razorback Sucker larvae show hybridization and are more similar to Flannelmouth Suckers than Razorback Sucker. There is currently more hybridization in Grand Canyon with Flannelmouth Suckers than was found in 1991, but there are not enough samples to say it has become more extreme. Dowling speculates that Flannelmouth Suckers in Grand Canyon spawn in the same locations as Razorback Sucker and that leads to their hybridization. Mussmann mentions that in the San Juan River, the primary challenge is although hybrids are recruiting, pure Razorback Sucker are not that we know of. Ryden noted that some Razorback Sucker are spawning in “poor habitats” throughout the river which often leads to poor post-spawning survival and suggests that since these Razorback Sucker are hatchery fish, maybe they do not know what type of spawning habitat to seek out to allow successful spawning/recruitment. Mussmann stated that we would need to be concerned with Razorback Sucker recovery if we start seeing backcrossing into Razorback Sucker (most of what we have seen is backcrossing into Flannelmouth Suckers).

#### **General discussion of FY2021 results and progress toward recovery**

The discussion focused on Nonnative Vegetation to Enhance In-stream Habitat for Native Fishes project. V. Lamarra remarked that geomorphic events are critical to effort success and therefore, efforts should be focused on secondary channels, manipulating large trees so they become permanent parts of the river adding complexity and mimicking destabilization of a bank. McKinstry points out the challenges of permitting stating that trees can become navigation hazards. Warren acknowledges the importance of habitat manipulation and creation as one of the best tools we have and suggests utilizing small- and large-scale woody debris. Mazzone suggests using the known secondary channels with beaver dam analogs to create ponding for more consistent low velocity habitat or higher value towards recruitment. Furr mentions that the introduction of Russian Olive and Tamarisk may have created more problems along the San Juan River than solutions.

#### **Update and recommendations from nonnative fish management small-group – Durst et al.**

Durst mentioned developing nonnative fish adaptive management plans that prioritize activities and research towards improving efficiency of nonnative removal and increasing the number and survival of stocked fish. Durst provided an overview of example projects the sub-group identified including egg and larval Colorado Pikeminnow stocking, flow conditioning for age-1 Colorado Pikeminnow, Channel Catfish literature review and data dive, Channel Catfish telemetry projects for removal, and Trojan Y chromosome approach. Zeigler provided a presentation on the Trojan Y chromosome approach as a genetic population control method where the population’s sex ratio is skewed towards males and leads to an eventual population collapse. The population simulations for Brook Trout indicate that extirpation is possible within 15 years or less. Zeigler also mentioned that this process has been applied for Brook Trout in 6 different states, with significant sex-ratio shifts within two of three treatment populations in New Mexico. Warren mentions that once the YY broodstock are obtained, the cost is low and can be a tool to use in the future to stop recolonization. Cunningham suggested finding a supplier external to the Program for the YY broodstock since our hatchery facilities are limited.

Schleicher comments that we are 2 generations out before we can start stocking the YY broodstock at the numbers that we need. McKinstry recommends the Program pursue this method, Warren and Schleicher also recommend this method and there are no objections from the rest of the BC.

### **Proposal for stocking Colorado Pikeminnow eggs and larvae in 2022 – Diver**

Diver presented this as a pilot project proposal for 2022 which would have no additional costs to the Recovery Program. The project proposes increasing the number of breeding pairs that SNARRC spawns annually from 25-30 to 40 pairs, which should give 250,000 eggs and 250,000 larvae for this stocking pilot. The goal of this proposal is to increase the overall number of fish stocked into the San Juan River and evaluate the success rate of different stocking treatments for eggs and larvae. Since the exact parental pairs and potential genotypes will be known, subsequent collections of individuals from this effort could be traced back to either stocking treatment. The genetic analysis would require testing all captured larvae or untagged older life stages to separate those stocked from this project and any other stocking or wild production. Durst commented that this project would be low risk, with high reward. Miller wants to review Scope of Work before pushing to the Coordination Committee. Diver will receive and incorporate comments and then pass on to Coordination Committee by end of April.

### **Update on fish passage at APS – Franssen**

Two alternative designs were presented for APS: 1) a river-left fishway entrance close to APS sluiceway and rock ramp at the structure and 2) a river-right constructed concrete fish bypass with a sluiceway out in front where there would be a gate upstream of the passage so sediment can be flushed. Both alternatives have advantages and disadvantages, primarily, the first alternative although originally preferred by the BC, would require a diversion of the entire channel around the weir to tie into the side of the sluiceway to bedrock. The second alternative, although easier to maintain and more cost efficient, would have the entryway on the opposite side of the attraction flow and there are potential sediment issues inside the bend. McKinstry remarked that the second alternative is on river-right side where land ownership may be a challenge or that Reclamation will likely need to have a long-term lease agreement for construction. Franssen concluded that both designs are being sketched and preliminary costs calculated so the BC can assess and readdress.

### **Colorado Pikeminnow larval habitat availability and habitat use study – Miller and V. Lamarra**

Low and zero velocity habitats, such as backwater, slack water, and secondary channels, were the primary focus on less mobile larval stages. Larval occupancy and retention in habitat are controlled by hydraulics and hydrology. Overall, for both Colorado Pikeminnow and Razorback Sucker larvae low and/or no velocity habitats are needed to persist from April through mid-August. V. Lamarra mentioned hypothetical backwater habitat from 2019 indicated Colorado Pikeminnow spawning dates are higher in backwater area than discharge area; and that there is more availability in Reach 5 than 3 or 4, which leads us to expect to have higher retention and recruitment if fish can get to Reach 5. It is known that flow regime has changed with flow recommendations, and that the main channel and secondary channels have changed since 1992 based on mapping. Low velocity habitat appears to reset after high flow, but there is an unknown relationship for low water years. Data suggests wild produced larvae are occurring annually, although wild Age-0 fish are collected less frequently than annually. Bill Miller and V. Lamarra remark on a need for habitat measurements multiple times a year to

determine spatial and seasonal habitat availability and where habitat is being occupied. Bill Miller and V. Lamarra also proposed collecting new data and flow analysis variations within a single year, and data to determine loss of larvae at low end of San Juan into Lake Powell. The committee supported the development of a project scope of work for consideration in the fiscal year 2023-2024 work plan.

### **Update on Phase III – Mata**

Work has not been completed, but photos and videos will be sent in the next week.

### **Developing a new managed wetland – McKinstry**

McKinstry mentioned a potential new wetland development project in Bluff, UT near Recapture Lodge and Cottonwood Wash. The intention of this project would be to explore if introducing Colorado Pikeminnow and Razorback Sucker into the San Juan River at an earlier life stage could possibly trigger successful wild recruitment and spawning. A project at this site would also allow the Program to partner with a willing landowner. This location was previously dismissed due to pumping costs and the location was thought to be problematic. Franssen remarked that the inlet channel is choked with trees and there would need to be a large tree removal effort to pump water continuously during larval removal to get Razorback Sucker into the site, but that may be avoided if larvae are stocked. McKinstry stated this might be a more managed system but could be relatively easy since it is at high elevation (although still in a flood zone). McKinstry also voiced skepticism about the location being a deterrent, as previously presumed. Bill Miller noted that this is a very similar situation as NAPI. McKinstry said that NAPI rears much larger fish and the idea would be to stock this wetland with larvae at the earliest stage possible to get them acclimated to the San Juan River water and hopefully improve survival to later life stages. Mata, Keith, and McKinstry agree to discuss further and bring it back to the BC.

### **Submission of FY2023 SOWs – BC**

Deadline for Scope of Work (SOWs) are due at the end of March. BC will run through 2022-2023 draft list of Program priorities document. Program Office will continue conversations with PI about what SOW should proceed.

Potential new 2023 SOW based on discussion from today's meeting:

- Channel Catfish Telemetry Project
- Channel Catfish Literature Review and Data Dive
- Nonnative Removal
- Colorado Pikeminnow and Razorback Sucker Early Life-Stage Habitat
- Rearing Wild Native Sucker Larvae in Captivity
- Stocking Colorado Pikeminnow Eggs and Larvae

### **Navajo-Gallup Water Supply Project intake at PNM – Eric Creeden**

The Navajo-Gallup Water Supply Project (NGWSP), run by the Bureau of Reclamation (Reclamation), is a large-scale water infrastructure pipeline project meant to divert water from the San Juan River. Reclamation is drafting an Environmental Assessment for incorporating lands and facilities associated with PNM and San Juan Generating Station into NGWSP. Along with

maintenance adjustments and installations such as radial gate(s), cofferdam at river exit, and a new fish raceway along the south wall of the outlet, Reclamation wants to increase diversion rate from 59 to 71cfs. Reclamation is planning to reinitiate formal consultation but will incorporate all comments from the Environmental Assessment first.

### **Program updates**

#### **Update of FY2021 funding – McKinstry**

Last year Recovery Programs' financial dependence was on power revenues, this year the budget included funding to come under appropriations from the Bureau. This year should be fully funded, though when that will be available is unknown. Currently there is money that can go towards American Southwest Ichthyological Researchers and Navajo Nation. There may be outstanding projects from COVID that will be considered.

#### **Smallmouth bass illegal introduction in Long Hollow Reservoir – Crockett**

Long Hollow Reservoir is a private irrigation reservoir that connects to the La Plata River which connects to the San Juan River. Colorado Parks and Wildlife sampled and found illegally introduced smallmouth bass. A screen between Long Hollow Reservoir and La Plata River was temporarily removed and there is concern that smallmouth bass may be in the San Juan River. Zeigler mentioned that no smallmouth bass were captured in the La Plata in New Mexico when it was sampled this year, but sampling will continue next year. Crockett mentioned that if smallmouth bass are found rotenone treatment may be considered for the following season.

#### **Nonnative fish stocking cooperative agreement – Mata**

Mata is exploring an independent route for Navajo Nation participation in a single nonnative cooperative agreement and will report back to the BC and CC.

#### **Jicarilla Apache Nation water leasing agreement update – Cunningham**

Waiting on Federal approval for the lease agreement of up to 20,000 acres of water for 10 years with State of New Mexico. Agreement is in preliminary stages, once permits are granted Cunningham will address the PO about water usage options associated with benefitting protected species and to aid in compact compliance.

#### **DROA – Franssen**

Reclamation provided a DROA draft plan to partners to review at the end of December 2021 and are hoping to have the plan finalized by end of April 2022. Reclamation and Navajo Nation are waiting for March snowpack results before possibly requesting a spring peak release. Mata mentioned possibly using water from Flaming Gorge to Lake Powell but is waiting until April for DROA release guidance.

#### **BC input on proposed capital improvements at SNARRC – PO**

The primary goal of the improvements would be to increase the facility's capacity to implement and investigate hatchery enrichment practices to increase survival of stocked fish, increasing the efficiency of these management actions. Specific improvements included 4 quarter-acre lined ponds, 4-8 flow conditioning raceways, and 1 standalone building. Westfall wants to see a cost-benefit plan and asked if this conditioning is successful, to which Durst responded that there is work cited on Razorback

Sucker (not Colorado Pikeminnow) that doubled the survival rates. Bill Miller wonders if there is a way to project production from these ponds, Franssen and V. Lamarra mention that the enrichment should increase retention and survival but there are too many possible combinations of stocking strategies to predict production numbers. Davenport agrees that this can affect SNARRC capacity to a more efficient working capacity. McKinstry motions to advance the proposal to CC, Crockett seconds. Motion passed unanimously apart from Westfall abstaining and will be forwarded to the CC for their approval.

**Reporting requirements/templates and 508 compliance – PO**

Annual reporting and documents must now be compliant with the Americans for Disability Act, this way anyone of the public can use this information. The San Juan River Basin Recovery Implementation Program and Upper Colorado River Endangered Fish Recovery Program are creating consistency between each other via similar new websites accessible to the public and similar reporting templates for 2023. Mata is the current point of contact for any questions regarding compliance with the Americans with Disabilities Act.

ACTIONS ITEMS FROM 22-23 FEBRUARY 2022 BIOLOGY COMMITTEE MEETING

1. The PO will send a Doodle poll to schedule a BC meeting in May.
2. Last meetings' BC notes need to be reviewed and approved and video links need to be fixed – or summarized points from nonnative symposium included.
3. Creating a vice chair for BC or alternating the rotation schedule to be revisited by BC later.
4. Tracy Diver will receive and incorporate comments on proposal for stocking Colorado Pikeminnow eggs and larvae for 2022 by the end of April and will pass on to CC.
5. PO will forward Scope of Work for capital improvements at SNARRC to CC with suggestions.
6. Mata will continue to work with Navajo Nation on the Nonnative Fish Stocking Cooperative Agreement and report back to the BC and CC.
7. After Jicarilla Apache Nation water leasing permits go through, Cunningham will report to PO about water usage options.
8. Scopes of Work are due at end of March.